# Knowledge Diffusion and Management in The Case of Taiwan's Scanner Industry

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The process of rapidly disseminating, generating, and diffusing the engineering knowledge in the product and process development (PPD) has been a key imperative for the sustained growth of technology-based firms. Taiwan's personal computer (PC) image scanner industry serve as a good example. They have established, in the past decade, a high degree of proficiency in the process, as demonstrated in their rapid product development, seamless process integration, and efficient technology dissemination and diffusion. Their effectiveness in capturing the dynamics and leveraging the asset in the process, however, still leaves much to be desired.

This study is directed to investigating a knowledge diffusion and management (KDM) model designed to illustrate the ways to leverage both the R&D asset and the knowledge capital to further enhance the product development performance. Central to the model is an ontology-based knowledge mapping process, which is formulated to govern the knowledge flow and to mediate the discourse between KDM and PPD systems. A prototype model built on top of the knowledge-based knowledge flow system is developed to illuminate the co-evolution of PPD and KDM systems. Applications to the scanner PPD processes is demonstrated to evaluate the various ways the KDM model can be used to enhance the capabilities of a PPD organization in knowledge generation and diffusion.

In this model, we may further explore the role and the impacts of knowledge diffusion on the scanner technology system as witnessed in the evolutionary paths of Taiwan's scanner industrial innovation from the viewpoint of knowledge flow. Through industrial data collection and interviews with industrial experts, we try to illustrate the engineering knowledge flow, including the diffusion models, paths and impacts. Moreover, we have constructed a firm-level dynamic simulation model of knowledge flow based on the evolution theory, and discuss the mechanism linking knowledge diffusion, innovations and firm growth. We try to explore the mechanisms of the innovation system of Taiwan's scanner industry by comparing the simulation outputs with industrial data. Through the systematic analysis and simulation, the complex, non-linear relationships in system mechanisms can be presented, and the qualitative features of the system dynamics can be observed. Comparing the results and the industrial data, we can gain insights in the system structures and processes of the interactions among the knowledge diffusion, industrial innovation and growth.